

Finnish Goals of Health Policy and Medical Research

HANNU VUORI, PhD, MD

AT THE REQUEST of the Ministry of Education, in early 1971 the Finnish National Board of Medical Science prepared a plan for the allocation of State funds appropriated in the budget for the support of medical research (1). At the same time, the Economic Council, an advisory body to the Council of State, appointed a task force to study the possibilities of establishing priorities for and using social indicators in social planning (2). The National Board of Medical Science based its plan on the concept that the goals of medical research are ultimately determined by the goals of the general social policy of the country (3). Thus, it seemed appropriate to study the relationships between the goals of social policy and those of medical research (1).

It is necessary to find ways to derive the goals of research from the goals of social policy. These ways are closely related to attempts to improve social planning and decision making.

Tools of Social Decision Making

Social planning and decision making have been characterized by a strong emphasis on means. As the drawbacks of this approach have become more and more evident, attempts have been made to develop tools for the rationalization of social planning and decision making. Characteristic features of these tools are the presentation of the activity under scrutiny in the form of system

analytic models, explicit definition of goals and determination of their relative priority, identification of the means available for the achievement of these goals, and assessment of the costs of the alternative means. Finally, it is necessary to assess the effects and efficiency of the actions undertaken in relation to the stated goals and objectives. This implies that the state of the society and its changes can be measured.

Goals-means analysis. Goals-means analysis is a way to systematize the endeavors of a social organization to achieve some stated goals. First, the ultimate goal of the action or program is defined, and then this goal can be divided into concrete objectives.

Goals can be conceptualized as variables that have different values. This variation can be explained by factors that influence the goal variable. Based on this explanatory model, it is possible to

Dr. Vuori is acting professor of public health, University of Kuopio, and currently fellow, Harvard University Center for Community Health and Medical Care. A member of the Finnish National Board of Medical Science, Dr. Vuori was the chairman of the Task Force for the Establishment of the Goals of Health Policy. Tear-sheet requests to Hannu Vuori, MD, Department of Public Health, University of Kuopio, Kuopio, Finland.

build up a relevance tree that contains factors relevant to the achievement of the goal.

The relevance tree forms a hierarchy of goals and means in which a lower level contains the means necessary for the achievement of the goal of the upper level. These means can, in turn, be goals of the still lower levels. Thus, more and more detailed means and directives will appear toward the bottom levels of the tree. The tree enables one to visualize the problem under scrutiny and to correlate the goals and means. Figure 1 is a relevance tree that is concerned with the elimination of hereditary diseases.

Although most relevance trees have been built in the domain of techniques, there are no principal obstacles to using them also in social policy. It is difficult, however, to construct relevance trees in the field of social policy because of the poorly defined goals and the multitude of factors that explain their variance.

Cost-benefit analysis. The basic questions of cost-benefit analysis of social projects are:

1. Which costs and benefits should be included in the analysis?
2. How should these costs and benefits be evaluated? (4,5).

The first question is related to the scope of cost-benefit analysis. The external effects that may occur entirely within other sectors of social policy than originally intended, and that are typical of many social programs, present difficulties in cost-benefit analysis. The analysis should cover all relevant costs and benefits, but for practical reasons it is necessary to delineate a boundary.

The basic difficulties related to the evaluation of costs and benefits are the comparison of benefits occurring at different points in time and the pricing of costs and benefits.

The benefits of social projects characteristically occur at different intervals. Because people usually appreciate the most immediate benefits, benefits occurring at different points in time must be made commensurate by discounting them at an appropriate rate. It has been suggested that 10 percent might be a good discount rate for social projects. In developing countries, it may be necessary to use a higher discount rate, as it is often important to obtain the benefit as quickly as possible (5).

It would be preferable to measure the costs and benefits by means of a common unit. The monetary value of the costs can be expressed as the price of the production factors used. The pricing of benefits is far more difficult because many

commodities and services have no market prices due to the lack of a market mechanism or because production has been subsidized. Moreover, the benefits are subjective from the individual person's point of view. For instance, the relative value of education and health varies according to the level of education and state of health and wealth of the individual.

Cost-benefit analysis may suggest better alternatives than previously utilized; however, the analysis is usually limited. Possibly, the best alternative has been neglected or it has been omitted from the analysis because of the political realities.

Priorities of goals and means. If we knew the different social goals and if we could express the costs and benefits of the goals and of the means available for their achievement by using a common unit, establishment of priorities could be reduced to mere computation. As neither one of these assumptions is true, it is necessary to resort to subjective evaluations in the selection of goals and means.

Four methods have been used to establish the priorities of goals (6). It is possible to use explicitly stated goals of social policy (for example, in the form of laws or international conventions) or to study which values and goals are implicitly influenced by previous political decisions.

The relative preferences expressed by consumers in their market behavior or in special surveys also have been used as a basis for establishing priorities. As the consumers do not always have enough information about the real costs of the commodities and services they use, because of the lack of price and market mechanisms, this third method does not provide a reliable basis for decision making.

The fourth method consists of using experts to establish priorities. It should be stressed, however, that the role of the expert should be limited to the evaluation of the costs and benefits of alternatives, since the priorities of the experts can be based on sheer technological calculations or subjective evaluations and thus can be misleading (4, 5). The politicians' task is to transmute the preferences of the electors and the opinions of the experts into the goals of the society. The subjectivity of the priorities can be seen, for instance, in evaluations of the value of human life in different contexts. One may compare, for instance, investments made to save human lives in traffic, in mines, and in nuclear powerplants.

Social indicators. The special goals of the

society are usually related to the state of the environment or the population—level of environmental pollution, amount of delinquency, level of education, and level of health of the population. Usually it is not possible to measure these states directly. Because it is necessary to demonstrate objectively how well the society has achieved its goals by means of the projects undertaken, indirect measurement by means of social indicators has been used. Social indicators can be defined as the statistical information that enables precise, comprehensive, and balanced assessments about social conditions (7). The value of the indicator expresses the direction and size of the change with regard to the stated objectives. The functions of the social indicator system can be defined as follows:

1. By means of social indicators, it is possible to identify the needs and problems in the society that require the use of the resources of the society.
2. By means of social indicators, it is possible to measure how well the society has succeeded in achieving its goals.
3. Social indicators help to create a firm basis for public discussion and decision making in

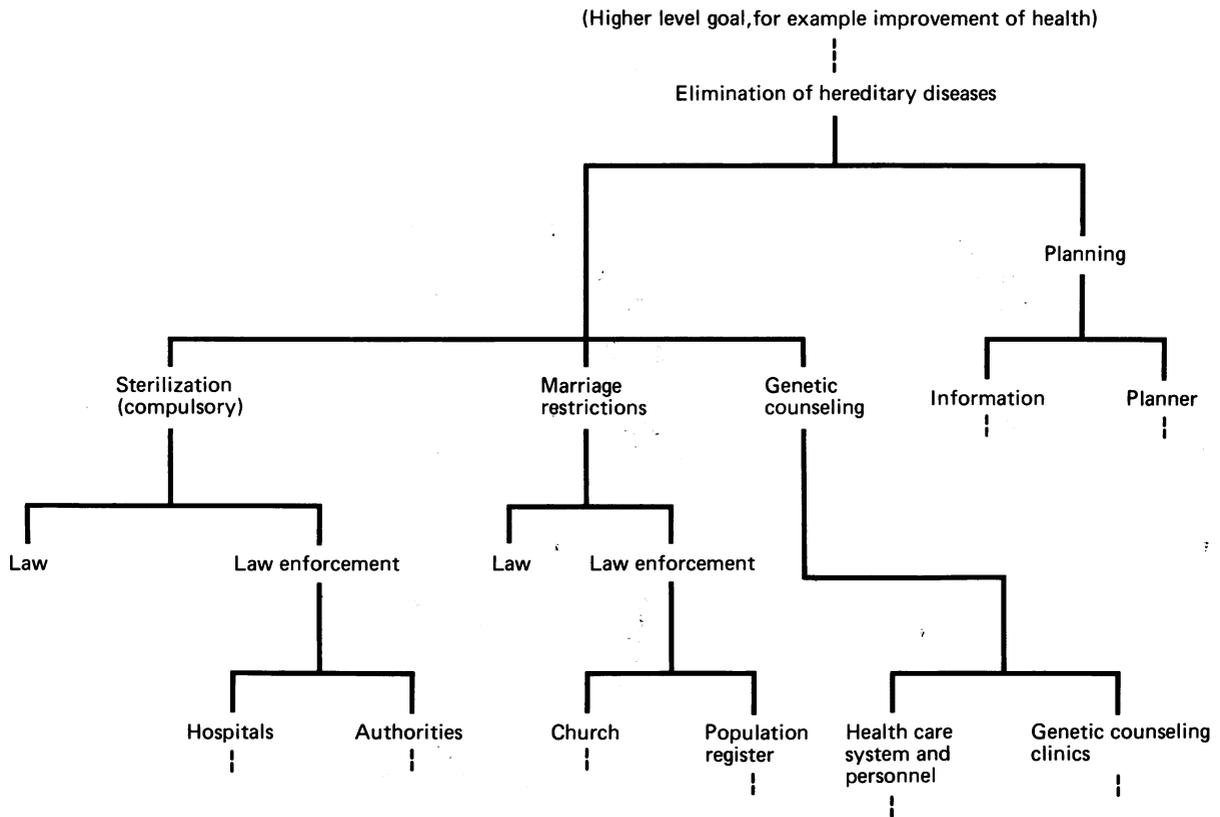
choosing between different political action alternatives and allocation models (8).

Many statistics currently being collected have been used as social indicators. Most of them, however, are related to the means of social policy rather than to its goals. They have not been planned for early identification of social problems and evaluation of the effect of projects undertaken.

Health as a Component of Welfare

The general goal of social policy is to increase the welfare or the level of living of the population. In the simplest approach, level of living is identified with national income per capita. Because this approach has several limitations, attempts have been made, especially within the United Nations, to develop new methods for defining and measuring the level of living (9-12). A major characteristic of these methods is the division of the level of living into several components. In the reports of the expert committees of the United Nations, nine factors have been mentioned as components of the level of living: health, nutrition and consumption, housing, education, employment and

Figure 1. An illustration of relevance tree: elimination of hereditary diseases



working conditions, clothing, social security, recreation, and human rights.

Johanssen (13) considers health the most important component of the level of living, because impairment of health always means impairment of the level of living. Drewnowski has coined the concepts of the production effect of social development and of the welfare effect of economic growth to describe the relationships between the improvement in the different components of living and economic growth (6, 14).

Welfare effect implies that the components of the level of living develop approximately at the same rate. The population problem of developing countries is a good example of imbalanced growth. The rapid development of health services has contributed to the decline of mortality, and thus it has increased the amount of the most important production factor, labor. Excessive labor has become, however, a brake instead of an incentive for economic development because the educational system, industry, and so on have not developed with the same speed as health services.

Economic growth, on the other hand, often contributes to increasing well being. For instance, in the industrialized European countries, the increased life expectancy during the past 200 years can be attributed more to the general increase of

well-being than to the development of health services.

The following mathematical model or welfare equation describes the relationship between the level of living and its components (5):

$$W = f(aY_h, bY_d, cY_e, \dots, nY_n), \quad (1)$$

where

W = level of living,

Y = level of the components of level of living,

h (health), d (dwelling), e (education), . . . ,

and n indicate the components of the level of living in question, and a, b, c, \dots, n are coefficients that indicate the relative contribution of the components to the general well being. At present, we do not know which factors should be included in this equation and what are the values of the coefficients.

Figure 2, a model of the ultimate goal, objectives, and means of social policy, adapted from Kissick (15), illustrates the interrelationship of the components of the level of living.

The principal way to reach the goal (Y) within a certain sector is to allocate a part of the available resources (X) to that sector. Achieving the goal is also influenced by the state of the other sectors and the utilization of resources within them. The welfare function of each sector can thus be expressed by means of the resources allo-

Figure 2. Relationship between resources, system, objectives, and goal

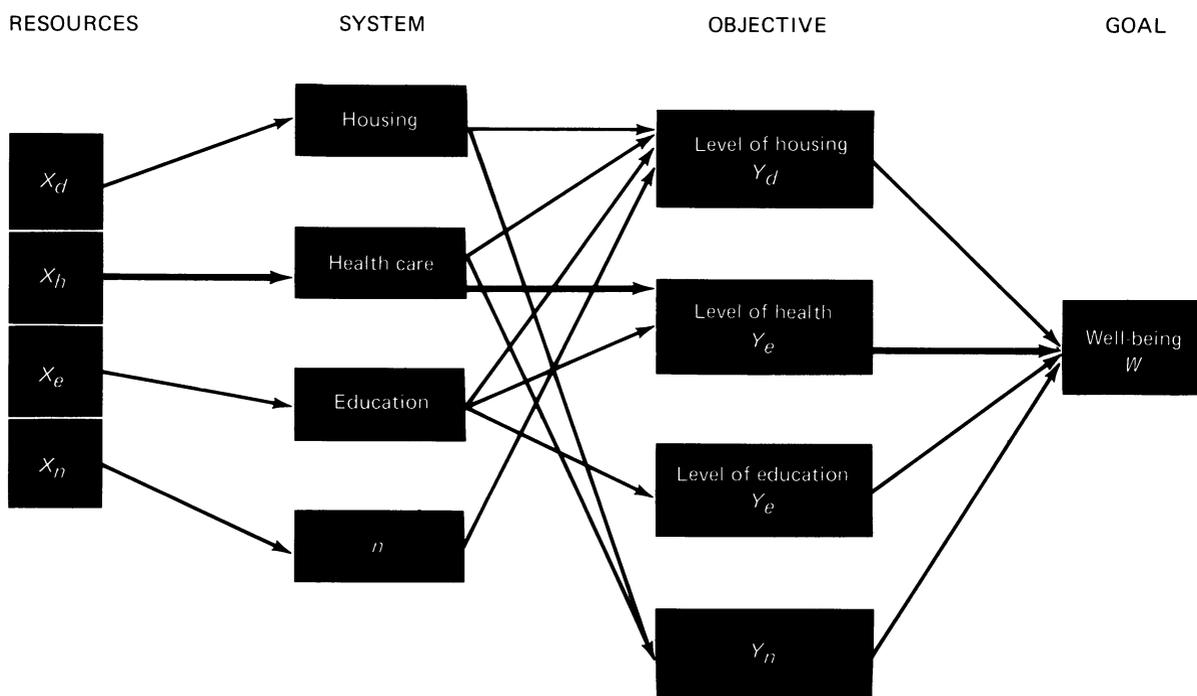
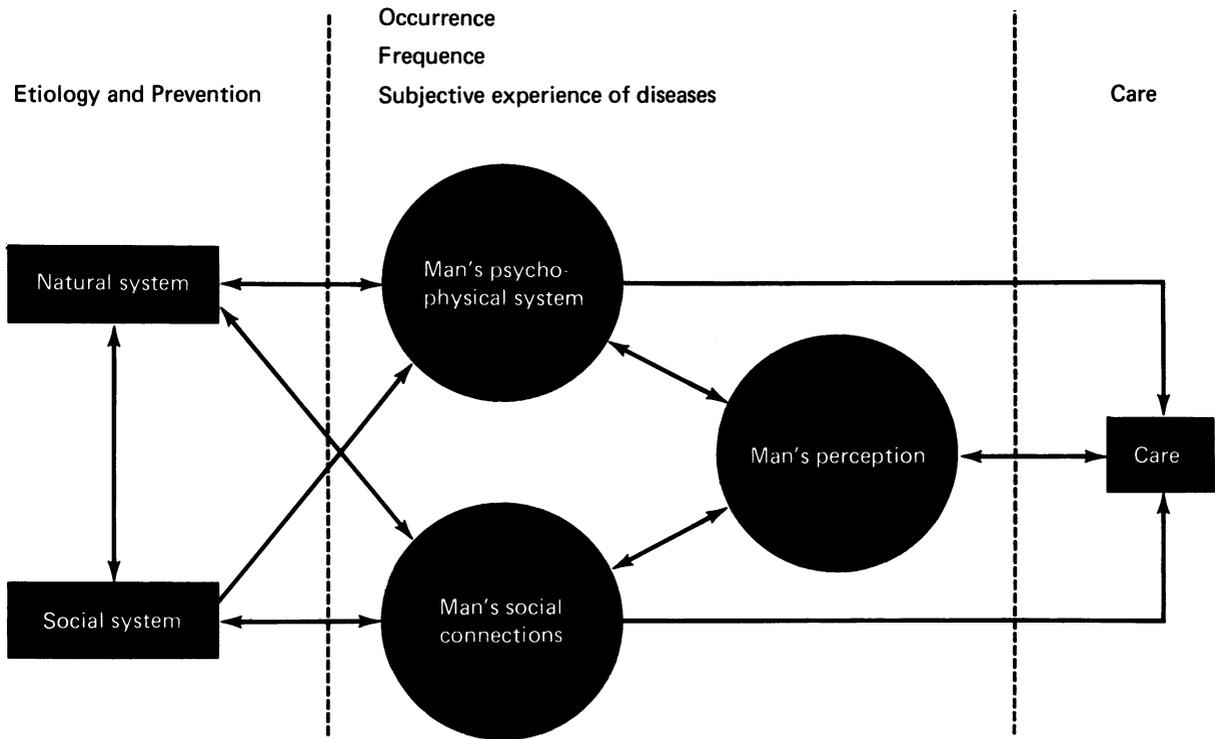


Figure 3. System analytic model of health-illness system



cated to the sector and either by means of the state of the other sectors (equation 2) or by means of resources allocated to the other sectors (equation 3).

$$Y = f(aX_h, bY_d, cY_e, \dots, nY_n) \quad (2)$$

$$Y_h = f(aX_h, \beta X_d, \gamma X_e \dots, \lambda X_n) \quad (3)$$

Since it is far more difficult to measure the state of housing, education, and health care than to measure the resources allocated to these sectors, equation 3 is the most useful tool in determining the optimum allocation of the resources. This transformation equation shows how the resources do transform to the stated goals. The equation illustrates the close interrelationship of the various sectors of the social policy. It emphasizes the importance of thinking in terms of alternatives, not only in choices within the sector, but between the sectors.

System analysis of the health care system.

The definition of health of the World Health Organization contains an embryo of system analytic thinking. It shows that the concept of health contains a physical, mental, and social component. In Finland, the Task Force on the Goals of Health Policy (2) and Purola (16) have developed a system analytic model of health care. Figure 3 is a modified illustration of this model.

The most important etiological factors are the

natural and social systems and their action on the individual person—the element of the system. The human organism, in turn, consists of a physiological and a mental system which together comprise the psychophysical system of man. Within the internal system of man, cognition should be distinguished as a third element. By means of these elements, it is possible to define the three dimensions of the concept of health-illness:

1. The deviation of the psychophysical system of the individual from the criteria of normal variation accepted in each society.

2. The perceived state of subjective illness.

3. The limitations of normal social participation.

This system can be conceived of as a cyclic process. From the etiological factors the process goes through the psychophysical system or limitations of social participation. If these changes are subjectively perceived as illness, the individual may seek medical care.

In this cycle, it is possible to distinguish two types of elements, states and actions. In figure 4, which represents a part of the general health-illness system, state elements are encircled and action elements are marked with arrows (17). The specific goal of each element can be derived from the general goals of health policy. To measure how well these goals have been achieved, we

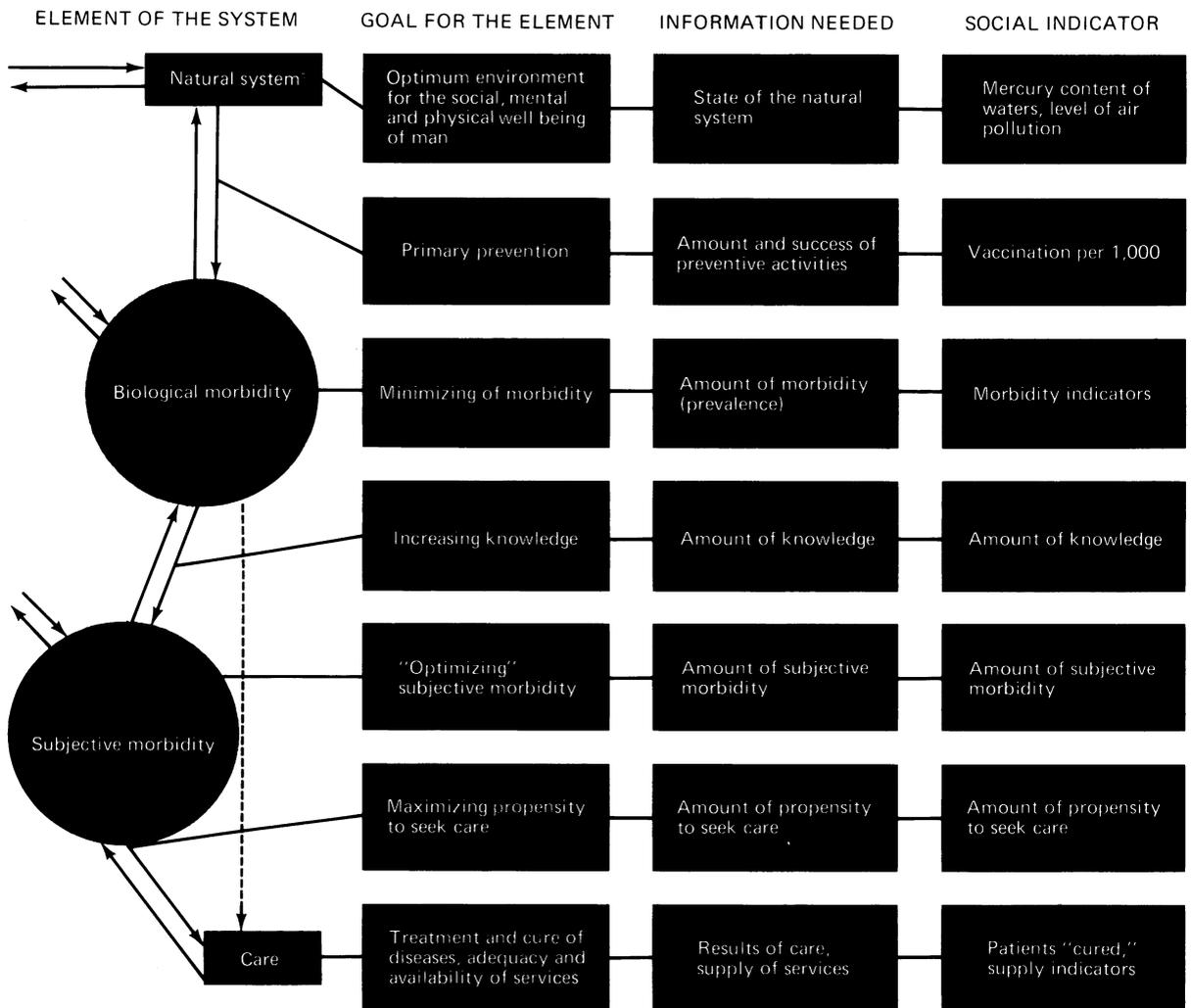
need information that can be operationalized in the form of social indicators. Figure 4 illustrates this idea.

Goals-means analysis of health care. Good health can be conceived of as a goal per se or as a means to achieve other goals. Nowhere does the actual situation correspond with the notion of health as a goal per se. For instance, in some areas half of the children will die before their first birthday. No country is rich enough to afford to all its citizens all the health services needed under all circumstances. Thus, it is necessary to choose not only between means but also between goals. For instance, in some countries it may be more rational to take as a goal the improvement of the

level of health of the working-age population at the expense of maternal and child health care, although it might be possible to achieve faster results for maternal and child health care.

The lack of goal analysis in health care has resulted in the transformation of the means of health policy into goals. This transformation is reflected, for instance, by the goals of health care set forth by law in many countries: the goal may be a certain physician or hospital bed ratio, with no mention of improving the level of health of the population. Such thinking may limit the array of means available in health policy. This tendency is enhanced by the traditional medical education, which is seldom based on an explicit analysis of

Figure 4. The elements of a system analytic model of health-illness system, its goals, information needed for measurement of achievement of the goals, and corresponding social indicators



the goals. There is nothing sacrosanct in the presently used means of health policy. Consequently, there is no reason to limit activities within the domain of health policy to these means.

Cost-benefit analysis of health care. If the production of health services is accepted as the goal of health care, the cost-benefit analysis is rather straightforward. Costs and benefits are commensurate, and it is relatively easy to compute cost-benefit ratio (18, 19). However, the cost-benefit analysis of health care also should include, in addition to those benefits that have a market price, benefits such as increased feelings of security, alleviation of pain, and decreased suffering. The specific features of the health care market that render the cost-benefit analysis difficult can be crystallized in the following points:

1. The principle of profit does not explain activities undertaken in the health market.
2. Price is not the only factor that regulates supply and demand.
3. Consumers do not choose between health services and other services exclusively on the basis of rational thinking.
4. Health services are personal services that may be beyond the price mechanism.
5. Health care has external effects that are beyond the price mechanism.
6. The health market is open, and producers represent different systems and organizations.
7. Compared with other fields of production, manpower is a very important production factor in health care. Thus, it is difficult to substitute capital or automation for manpower. Consequently, it is difficult to use alternative production methods (5, 15, 20).

Establishment of priorities in health care. In establishing the priorities of different goals, the methods prescribed earlier can be employed. As cost-benefit analysis of health care is hampered by many difficulties, recourse must be taken to more subjective methods in choosing means. In many cases it is necessary to pay attention also to the level of development of the society (21, 22).

The target of a health action, that is the health problem, can be chosen on the basis of relatively objective criteria. The magnitude of the problem should be such that its solution requires action from a segment of the society. The problem should be one affecting age groups whose health is esteemed in the society, and it should be possible to solve this problem, at least partially.

The Pan American Health Organization has

suggested some methods to measure these factors (23). The magnitude of the problem (M) can be measured by means of its relative proportion of the total morbidity or mortality. Its importance (I) is determined by the age groups in which it occurs. Here, different approaches can be adopted. It is possible to assign the same value to life disregarding age or to say that the significance of a death is lowest in the oldest age groups and vice versa. The PAHO suggests that the death of children under 1 year of age should be given the coefficient of 1, and 1 per 100 should be deducted for each subsequent year.

The vulnerability (V) of the problem can be measured by means of a scale ranging from 0 to 1. The scale value 1 could be assigned to diseases, such as smallpox, that can be completely eradicated. Most infectious diseases would have a scale value of 2/3 and accidents 1/3. The vulnerability of many neoplasms would be close to 0. These factors are shown in the form of the following mathematical model that also contains the costs (C) of the action (18, 23):

$$P = f(M, I, V, C) \quad (4)$$

The use of this equation (excluding the costs of the action) is illustrated in table 1 (23). In this example and in table 2, based on the Finnish death statistics, the values of M , I , and V have been obtained by means of the methodology suggested earlier.

This model has sometimes been presented in a more specific form.

$$P = \frac{M \times I \times V}{C} \quad (5)$$

In these equations, no coefficients have been used. As the magnitude of the problem can obtain greater numerical values than its importance or vulnerability, magnitude is the decisive factor in the equation.

As this, however, often means unjustified simplification, and impacts of the actions can occur

Table 1. Priority calculation for premature birth and pulmonary tuberculosis, Aragua, Venezuela, 1960

Cause of death	Magnitude (M)	Importance (I)	Vulnerability (V)	Relative priority ($M \times I \times V$)
Premature birth...	8.5	1.00	0.33	2.80
Pulmonary tuberculosis.....	2.8	.68	.66	1.25

SOURCE: Pan American Health Organization: Health planning: Problems of concept and method. Washington, D.C., 1965.

at different points of time, the equation should contain a coefficient for each factor and a time factor that corresponds with the discount rate of the cost-benefit analysis:

$$P = \frac{aM \times bI \times cV}{dC \times eT} \quad (6)$$

If we apply equation 5 as a mental exercise and an example to the Finnish death statistics from the year 1968 (24) we will get the order of priority shown in table 2. The picture thus obtained can be misleading for many reasons. The classification of causes of death is crude. The same classification categories can contain different diseases, and similar diseases can come under different classification categories. Furthermore, and more importantly, death statistics do not show the total burden caused by illness to the society.

While trying to establish the priorities for different health problems, it is necessary to take into account as many of the different social and economic consequences of disease as possible. One possibility is to develop a combined index from all available health statistics. In Finland, for instance, the following statistics can be used in such an endeavor: causes of death; causes for granting new disability insurances and causes of the exist-

ing disability insurances; persons who have received the daily allowance of health insurance for more than 100 days; survey results concerning chronic conditions; patients treated in hospitals; hospital bed days; and patients treated by primary care physicians. All these statistics can be classified according to the International Classification of Causes of Death and Illness. Many of these statistics are currently being employed as health indicators although they are rather indicators of the utilization of various health and social services.

In these statistics, relatively few classification categories are primarily responsible for morbidity. Thus, by giving scale values 1 to 4 to the four most important categories in the different statistics, we can get an order of priorities. These scale values can be added directly or they can be weighted by their relative proportion of the morbidity to obtain the total score of each classification category. The weighted and unweighted orders or priorities are identical:

- VII Diseases of the circulatory system
- XIII Diseases of the musculoskeletal system and connecting tissue
- V Mental disorders
- VI Diseases of the nervous system and sense organs
- IX Diseases of the digestive system
- XI Diseases related to birth and pregnancy
- VIII Diseases of the respiratory system
- XVII Accidents, poisoning, violence
- II Neoplasms
- I Infective and parasitic diseases

Table 2. Order of priority resulting from application of equation 5 to Finnish death statistics from 1968

Classification category	International Classification of Causes of Death	Order of priority
VII.....	Diseases of the circulatory system.	2.5
VIII.....	Diseases of the respiratory system.	2.4
XVII.....	Accidents, poisonings, and violence.	2.1
IX.....	Diseases of the digestive system..	1.2
X.....	Diseases of the genitourinary system.	1.2
II, XV.....	Neoplasms, certain causes of perinatal morbidity and mortality.	1.1
VI.....	Diseases of the nervous system and sense organs.	.9
XVI.....	Symptoms and ill-defined conditions.	.8
I.....	Infective and parasitic diseases...	.6
XI, III, IV....	Complications of pregnancy, childbirth, and the puerperium. Endocrine, nutritional, and metabolic diseases and diseases of the blood and blood-forming organs.	.5
XIV.....	Congenital anomalies.....	.3
XII, XIII....	Diseases of the skin and subcutaneous tissue. Diseases of the musculoskeletal system and connective tissue.	.2
V.....	Mental disorders.....	.1

This list is by no means intended to be definite; it is merely an example of the approaches available to establish priorities for health policy and medical research. The advantage of this method, however, is that it takes into account a great variety of impacts that disease and poor health have on the society. Based on calculations like this and some other more or less objective criteria, the four first groups of diseases listed have been given the highest priorities in the program of the Finnish National Board of Medical Science.

Social indicators of health care. Many presently collected statistics have been used as indicators of the level of health. These statistics can be divided into three groups: (a) demographic statistics, (b) statistics related to the level of health, and (c) statistics related to health economics (25). These statistics have not been de-

veloped for the evaluation of health activities. They usually describe everyday activities. The majority are related to the means of health policy instead of goals. Even the statistics that are related to goals, such as mortality and morbidity statistics, in their present form are often inadequate for social reporting (26).

The present information system is perhaps most complete with regard to treatment. With regard to etiology, our knowledge of the state of our biological and social environment is increasing but is nevertheless inadequate for social reporting.

With regard to the occurrence of diseases, Finland has documented a long historical series. These indicators, however, depend on many other factors besides the health policy of the country. For instance, they are influenced by the level of living and education of the population. Consequently, they are not particularly appropriate to be used as social indicators of health. Furthermore, these traditional indicators cover only a fraction of the total morbidity.

New methods have been devised to cover gaps in the present information system. These gaps are most evident in the field of perceived and latent illness. The most important new methods are health examination and health interview surveys. The Task Force for the Establishment of the Goals of Health Policy suggested that special health surveys be made in Finland. These surveys should combine health interviews aimed at ascertaining the amount of perceived illness and the factors influencing it and health examination surveys aimed at detecting latent illness. Based on the system analytic approach, the task force developed a system for social indicators. This information system contains 167 indicators. Of course, this is very impractical and strongly in disagreement with the hopes expressed, for instance, by the United Nations Research Institute for Social Development of developing one single combined index for every sector of social policy and, by combining these, for the level of living.

At present, however, it is more practical to use several indicators, since there is no theory that allows the development of a combined index. Additionally, specific separate indicators provide health planners with more suitable information for their needs than a combined index.

Conclusion

New tools, such as system analysis, goals-means analysis, and cost-benefit analysis, that are de-

vised for improving the efficiency of planning and decision making in the health field, are related primarily to health care programs. However, they can be employed also to determine the most appropriate field of interest for medical research. Applied without research, however, they can lead to a technocracy dominated by the experts and to the notion that improvement of the work can be achieved only by implementing organizational reforms instead of basic and applied research.

By defining explicitly the goals of the health policy and the means available to achieve these goals, these tools help to visualize the system within which medical research takes place. The establishment of priorities points out which problems should be the target of medical research aimed at solving socially relevant problems. In return, medical research can show new methods to obtain the desired results; it also enables evaluation of the influence of the actions undertaken.

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